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(54) COLOR PRINTER

(57)Abstract:

PURPOSE: To exclude waste caused in a test print to the utmost for setting image quality by printing out a reduced image over plural rows and plural columns, printing the image over plural rows changed according to 1st image quality and printing out the image over plural columns changed according to a 2nd image quality.

CONSTITUTION: A digital image signal is fed to a CPU 10, in which the signal is reduced by the software and the result is written in an image synthesis circuit 3. Two kinds of image quality are set by manual operation on a control panel 9 and gives a command to the CPU 10 as a parameter. The CPU 10 controls a density conversion circuit 4 and a color conversion circuit 5 according to the commanded two kinds of parameters. The density conversion circuit 4 and the color conversion circuit 5 read a digital image signal written in the image synthesis circuit 3 according to the commanded parameter and writes the signal

to a line buffer 6. The written digital image signal is fed to a recording head 8 via a driver 7 and printed out on one print paper sheet.

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In the color printer in which image quality adjustment of concentration, gamma, or a color tone is possible An image contraction means to reduce the image for printing, and an image quality setting means to set up two kinds of image quality as the 1st image quality and the 2nd image quality out of said image quality are provided. The color printer characterized by printing the multi-line which changes according to said 1st image quality, and printing two or more trains which change according to the 2nd image quality while printing the image reduced by said image contraction means over two or more trains of a multi-line.

[Claim 2] It is the color printer which possesses an image quality selection means to choose the contraction image printed by the n-th train (m and n are the natural number) of the m-th line as optimal image quality in the color printer indicated by claim 1, and is characterized by said image quality selection means

printing a full size image by the selected optimal image quality.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a color printer.

[0002]

[Description of the Prior Art] About the image quality of the output image of a color printer, if not actually outputted, plentifully, for a certain reason, it printed with the parameter of a suitable image quality setup conventionally, and the parameter of an image quality setup was anew adjusted from the output, and after that a result cannot be expected repeated the process of performing a printed output, it had obtained the printed output image of the image quality made into the purpose.

[0003] Moreover, although the color printer which can output the test pattern (for example, checker) to which the image quality parameter was changed gradually was also well-known, the test pattern output was not what is used in order to make into the best image quality the printed output image which it is used for

adjustment of the device of a color printer, and is made into the purpose.

[0004]

[Problem(s) to be Solved by the Invention] Thus, by the time it obtains the output of the image quality made into the purpose, it is necessary to perform the printed output of many sheets, and in the conventional color printer, there is a problem which the futility of time amount and an ingredient generates.

[0005] This invention was made in view of such a situation, and aims at eliminating the futility produced with the test print for an image quality setup as much as possible.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is set to the color printer in which image quality adjustment of concentration, gamma, or a color tone is possible. An image contraction means to reduce the image for printing, and an image quality setting means to set up two kinds of image quality as the 1st image quality and the 2nd image quality out of image quality are provided. While printing the image reduced by the image contraction means over two or more trains of a multi-line, it is constituted so that the multi-line which changes according to the 1st image quality may be printed and two or more trains which change according to the 2nd image quality may be printed.

[0007]

[Function] In the color printer of the above-mentioned configuration, while printing over two or more trains of a multi-line, the image reduced by the image contraction means Since the multi-line which changes according to the 1st image quality is printed and it was made to print two or more trains which change according to the 2nd image quality With changing the image quality of the image of the same pattern to the printed output of one sheet, and outputting it to it, it becomes possible to obtain efficiently the printed output of image quality made into the purpose, and the futility produced with the test print for an image quality setup can be eliminated.

[0008]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0009] Drawing 1 is the block schematics showing one example of the color printer by this invention.

[0010] In drawing 1 , a digital picture signal is impressed to an input terminal 2 from a computer etc. A digital picture signal is supplied to the CPU circuit 10, is made into area with software here, and is reduced to 9 by about 1/. The reduced digital picture signal is written in the image composition circuit 3, and is compounded by the image for 1 page.

[0011] The control panel 9 connected to the CPU circuit 10 is operated by the manual, sets up two kinds of image quality, and directs it in the CPU circuit 10 as a parameter. As a parameter about image quality, a concentration value, a gamma value, yellow color balance, Magenta color balance, or cyanogen color balance can be considered. The CPU circuit 10 controls the conversion circuit of the concentration conversion circuit 4 and the color conversion circuit 5 according to two kinds of directed parameters. The concentration conversion circuit 4 and the color conversion circuit 5 read the digital picture signal currently written in the image composition circuit 3 according to the parameter directed from the CPU circuit 10, and write it in a line buffer 6. The digital picture signal written in the line buffer 6 is supplied to a recording head 8 through a driver 7, and an image output is carried out at one sheet of print form 1 (refer to drawing 3).

[0012] The CPU circuit 10 controls the concentration conversion circuit 4, the color conversion circuit 5, and a line buffer 6 according to the flow chart shown in drawing 2 .

[0013] In drawing 2 , if a program starts, it will set to test print mode (refer to drawing 3), i.e., the mode which outputs nine reduced images to one sheet of print form 1, (step S1). Next, two kinds of image quality parameters set as the control panel 9 are read (step S2), and the variation of a test print is set up (step

S3). A setup of the variation of a test print means defining two variation, when changing and outputting to a three-stage. The CPU circuit 10 controls the conversion circuit of the concentration conversion circuit 4 and the color conversion circuit 5 according to two kinds of directed parameters. The concentration conversion circuit 4 and the color conversion circuit 5 read the digital picture signal currently written in the image composition circuit 3 according to the parameter directed from the CPU circuit 10, and write it in a line buffer 6. The digital picture signal written in the line buffer 6 is supplied to a recording head 8 through a driver 7, and an image output is carried out at one sheet of print form 1 (refer to drawing 3).

[0014] Drawing 3 shows the condition of having carried out the test print in three-line three trains. For example, yellow color balance can be changed and outputted to a three-stage by the lateral images 1a-3a, image concentration can be changed and outputted to a three-stage by the images 1a-1c of a lengthwise direction, and the combination of nine kinds of image quality parameters can be tried on one printed output.

[0015] After a test print becomes the usual printing mode (step S5), asks whether repeat a test print further (step S6), and when repeating a test print, it returns to step S1. In ending a test print, it sets the value for which it wishes out of nine kinds of image quality parameters outputted by step S4 as a control

panel 9 (step S7). After a setup obtains the printed output image (refer to drawing 4) of the image quality made into the purpose (step S8).

[0016] The image quality of the image of the same pattern is changed and the images 1a-3c shown in drawing 3 output it. Thus, various directions of the function to change image quality do and are convenient by preparing some patterns which make an image quality change for which it opted beforehand, and calling the pattern. The approach the combination pattern of the parameters (a concentration value, a gamma value, yellow color balance, Magenta color balance, cyanogen color balance, etc.) about image quality changes two parameters to coincidence as an example can look for a proper value efficiently. That is, when two parameters, a concentration value and yellow color balance, are chosen, parameters other than a concentration value and yellow color balance serve as a value then set up, and the screen where image 2b was printed with the concentration value at that time and the value of yellow color balance, and two parameter value was shaken in the direction of four directions of a screen, and it shook the value in the ** direction, respectively is printed.

[0017] In drawing 3 , image concentration becomes high at the order of Images 1a, 1b, and 1c, and the ratio of yellow becomes high at the order of Images 1a, 2a, and 3a. Image concentration becomes high similarly at image 2a, 2b, 2c, and the order of Images 3a, 3b, and 3c, and the yellow ratio becomes high at image

1b, 2b, 3b, and the order of Images 1c, 2c, and 3c. Moreover, it will further be easy to treat if the magnitude of the variation of the parameter value shaken in the ** direction also enables it to change.

[0018] The parameter of the printed output of image quality made into the purpose in the image of this output will be recognized, that value will be set to a print, and the print of image quality made into the purpose will be obtained by printing with the usual screen size. Moreover, when the print of the target image quality is not able to guess out of it, it prints by this approach until the image near the image quality which parameter value of further others is changed and is made into the purpose is obtained (step [of drawing 2] S1 - step S6 reference).

[0019] Since it becomes possible about a parameter to set up many things so that there are many images of the same pattern to output, when the form of a printed output is a large printer, it is desirable to make it output as many images (for example, seven steps of seven lines) as possible.

[0020]

[Effect of the Invention] As mentioned above, according to this invention, while printing over two or more trains of a multi-line, the image reduced by the image contraction means Since the multi-line which changes according to the 1st image quality is printed and it was made to print two or more trains which change according to the 2nd image quality With changing the image quality of the image

of the same pattern to the printed output of one sheet, and outputting it to it, it becomes possible to obtain efficiently the printed output of image quality made into the purpose, and the futility produced with the test print for an image quality setup can be eliminated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] They are the block schematics showing one example of the color printer by this invention.

[Drawing 2] It is the flow chart which shows one example of the color printer by this invention.

[Drawing 3] It is the front view showing one example of the color printer by this invention.

[Drawing 4] It is the front view showing one example of the color printer by this invention.

[Description of Notations]

1 Print Form

2 Input Terminal

3 Image Composition Circuit

4 Concentration Conversion Circuit

5 Color Conversion Circuit

6 Line Buffer

7 Driver

8 Recording Head

9 Control Panel

10 CPU Circuit